



INSTITUTE
OF TROPICAL
MEDICINE
ANTWERP

Vaccine Recommendations for People Living With HIV

BREACH 17-5-2025

Dr. Jelle Visser
jvisser@itg.be



ChatGPT 4o

Delen



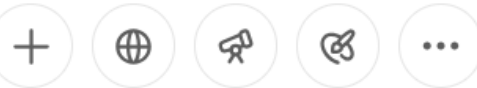
Where can I find the Belgium immunisation guidelines for people living with HIV?

Good evening, Jelle.

Belgium does not currently have national immunisation guidelines specifically tailored for people living with HIV. However, healthcare providers in Belgium often refer to international guidelines, such as those from the CDC (Centers for Disease Control and Prevention) and the EACS (European AIDS Clinical Society), to inform their vaccination practices for individuals with HIV.

Additionally, the Belgian Superior Health Council has issued recommendations on vaccinations for immunocompromised patients, including those living with HIV. These

Stel een vraag



ChatGPT 4o ▾

↑ Delen

⋮

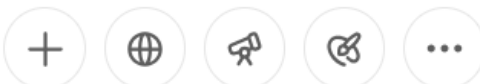
JE
PLUS

I think it would be better that we have national guidelines to make our practice uniform?! Who should lead that effort?

Breach, together with you—and with colleagues who are pro-vaxxers just like you.



Stel een vraag



Immunisation schedule for people living with HIV* (Last update: 15 May 2025)



Vaccine	16-26 years	27-59 years	60-64 years	≥65 years
HPV	2 or 3 doses (0 and 6 or 0, 2, and 6 months)	27-45 years: shared decision making		
Influenza	1 dose annually			Consider high dose
COVID-19 ¹	1 dose annually			
Pneumococcal disease ²	1 dose of PCV-20. Revaccination: every 5 years with PCV-20 (or higher valent)			
RSV	Considering during pregnancy ²		1 dose (patients with co-morbidities)	
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Meningococcal ⁴	If no prior vaccine, 2 doses of Men ACWY 8-12 weeks apart. Booster: every 5 years. Meningococcal B vaccine: if specific risk factors			
Mpox	2 doses; day 0, day 28 (if risk factors)			
Dengue (travel)	If previous infection: 2 doses, month 0 and 3 (if CD4 ≥ 200 mm ³)			
Yellow fever (travel) ⁵	1 dose, a single yellow fever revaccination is recommended for all PLWHIV and should preferably be administered before the next travel to a yellow fever endemic area with a minimal interval of 28 days. (if CD4 ≥200 mm ³).		Relative contra-indication ≥70 years for primo vaccination (shared decision making)	



Patient information

Aanbevolen vaccinaties voor mensen die leven met hiv

Inenting	Waarom vaccineren?	Praktisch
Vaccinaties aanbevolen bij iedereen		
Basisvaccinaties	Bescherming tegen veelvoorkomende ziektes	Vraag uw arts om te controleren of uw vaccinaties compleet en up-to-date zijn.
Bof-Mazelen-Rode Hond (BMR)	Voorkomen van kinderziektes bof, mazelen en rode hond die op latere leeftijd ernstig kunnen verlopen.	<i>Gratis vaccin</i>
Influenzavaccinatie (griep)	Verminderd risico longontsteking en griep.	Griep vaccin elk najaar (midden oktober- midden december) <i>Gratis vaccin</i>
Corona (SARS-CoV-2) vaccine (covid-19)	Verminderd kans ernstige corona	Volgens richtlijnen algemene bevolking. Als lage immuniteit (laag CD4 getal) dan herhaalvaccinatie aanbevolen. <i>Gratis vaccin</i>
Pneumokokken vaccinatie	Verminderd kans op	PCV-20 (Apexxnar®) éénmalig; ±

Vaccinaties aanbevolen bij specifieke doelgroepen

Hepatitis A vaccinatie (leverontsteking)	Vaccinatie voorkomt hepatitis A <i>Als verhoogd risico: reizen, MSM, leverziekte</i>	Maand 0 en maand 6 (of samen met hepatitis B) ; ± 45 € per vaccin <i>Geen terugbetaling</i>
HPV (humaan papillomavirus) vaccinatie	Verminderd risico baarmoederhals- en anale kanker; zo seksueel risico <i>Leeftijd 9-26 jaar. Soms tot 45 jaar (als hoog risico)</i>	9-valent vaccin. Maand 0, maand 2, maand 6. ± 132 € per vaccin <i>Geen terugbetaling</i>
RS-virus vaccinatie (longontsteking)	Verminderd het risico op ernstige RSV-ziekte <i>Alleen voor mensen >60 jaar met chronische aandoeningen.</i>	<u>Arexvy</u> (€ 206,30) of <u>Abrysvo</u> (€ 185,10) <i>Geen terugbetaling</i>
Meningokokken ACWY vaccinatie (hersenvliesontsteking)	Verminderd risico op meningokokkenziekte ACWY bij hiv	4-valent meningokokken vaccin (ACWY). Maand 0 en 2. ± 52 € per vaccin <i>Geen terugbetaling</i>
Meningokokken B vaccinatie (hersenvliesontsteking)	Verminderd risico op meningokokkenziekte B bij hiv	86,52 per vaccin. <u>Bexsero</u> : Maand 0, 1, <u>Trumemba</u> : Maand 0, maand 6 (of maand 0, 1 en 5) <i>Geen terugbetaling</i>



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In Belgium 2 out of 3 HZ patients are older than 50 years

With an estimated 880 -1306 QALYs lost due to HZ in immunocompetent ≥ 50 -year-olds



Estimated between 19,000 – 48,000 HZ cases to occur in Belgium annually



Around 900 individuals aged ≥ 50 years are hospitalized in Belgium for HZ annually

Mean duration of skin lesions



< 70 years old	29 days
≥ 70 years old	44 days

Mean duration of PHN

< 70 years old	254 days
≥ 70 years old	319 days

Upon hospitalization

- **Length of stay ranged from 1–229 days, with median length of stay of 9 days**
- **PHN occurred in up to 53% of hospitalized patients aged ≥ 80 years**
- 63.2% of hospitalized patients were aged ≥ 70 years

The total annual treatment cost for HZ in Belgium was estimated at almost 7 million euros



Vaccine efficacy of RZV against herpes zoster in adults 50+ is high in phase III studies.

Age (Years)	RZV Cases / Total subjects	Placebo Cases / Total subjects	VE % (95% CI) *
HZ			
≥50 ^{1‡} ZOE-50	6 / 7344	210 / 7415	97.2 (93.7, 99.0)
≥70 ^{2§} POOLED ANALYSIS ZOE-50 AND ZOE-70	25 / 8250	284 / 8346	91.3 (86.8, 94.5)

Age (Years)	RZV Cases / Total subjects	Placebo Cases / Total subjects	VE % (95% CI) †
PHN			
≥50 ^{2§} POOLED ANALYSIS ZOE-50 AND ZOE-70	4 / 13881	46 / 14035	91.2 (75.9, 97.7)
≥70 ^{2§} POOLED ANALYSIS ZOE-50 AND ZOE-70	4 / 8250	36 / 8346	88.8 (68.7, 97.1)
Non-PHN complications ‡			
≥50 ^{3§} POOLED ANALYSIS ZOE-50 AND ZOE-70	1 / 13881	16 / 14035	93.7 (59.5, 99.9)
≥70 ^{3§} POOLED ANALYSIS ZOE-50 AND ZOE-70	1 / 8250	12 / 8346	91.6 (43.3, 99.8)

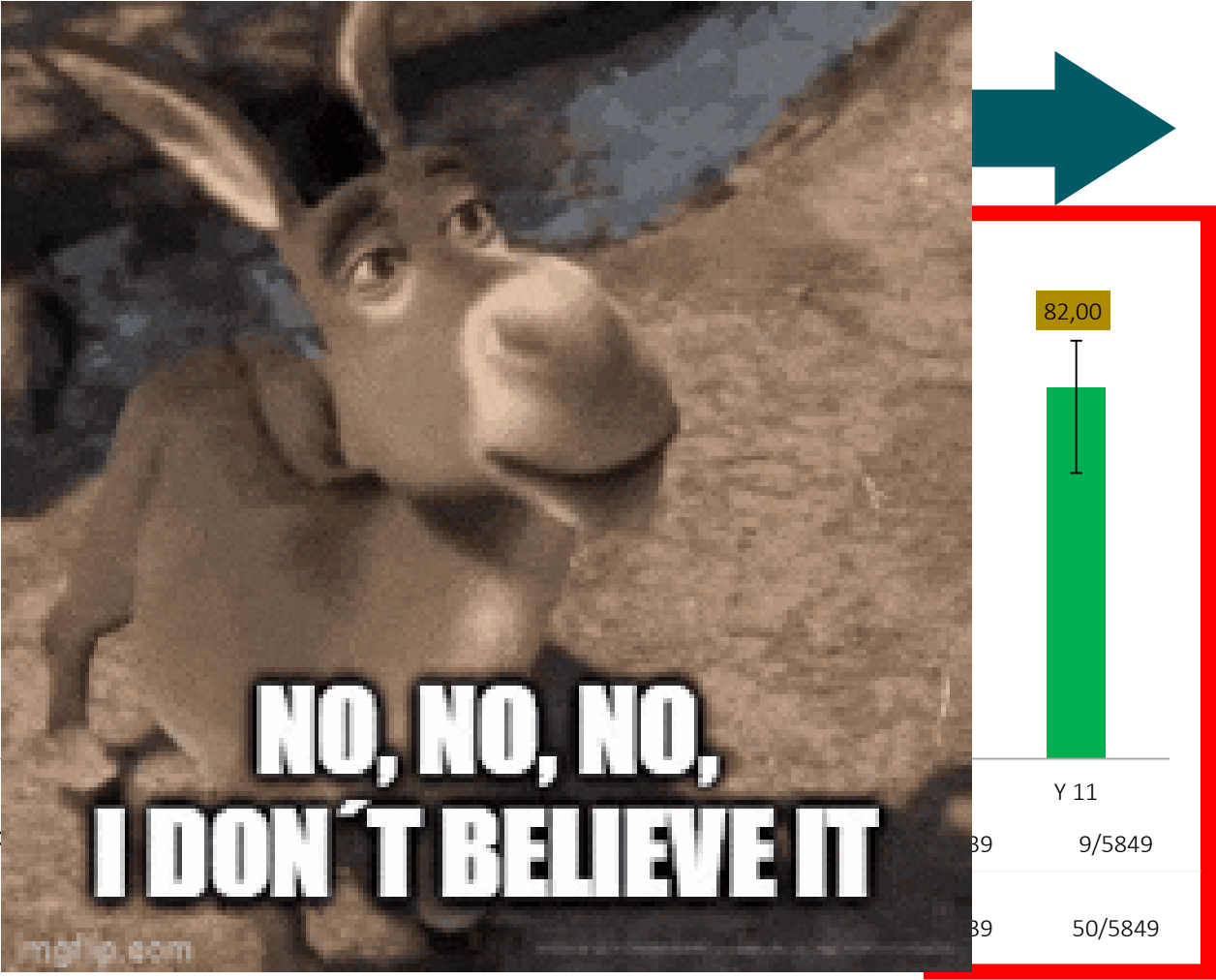
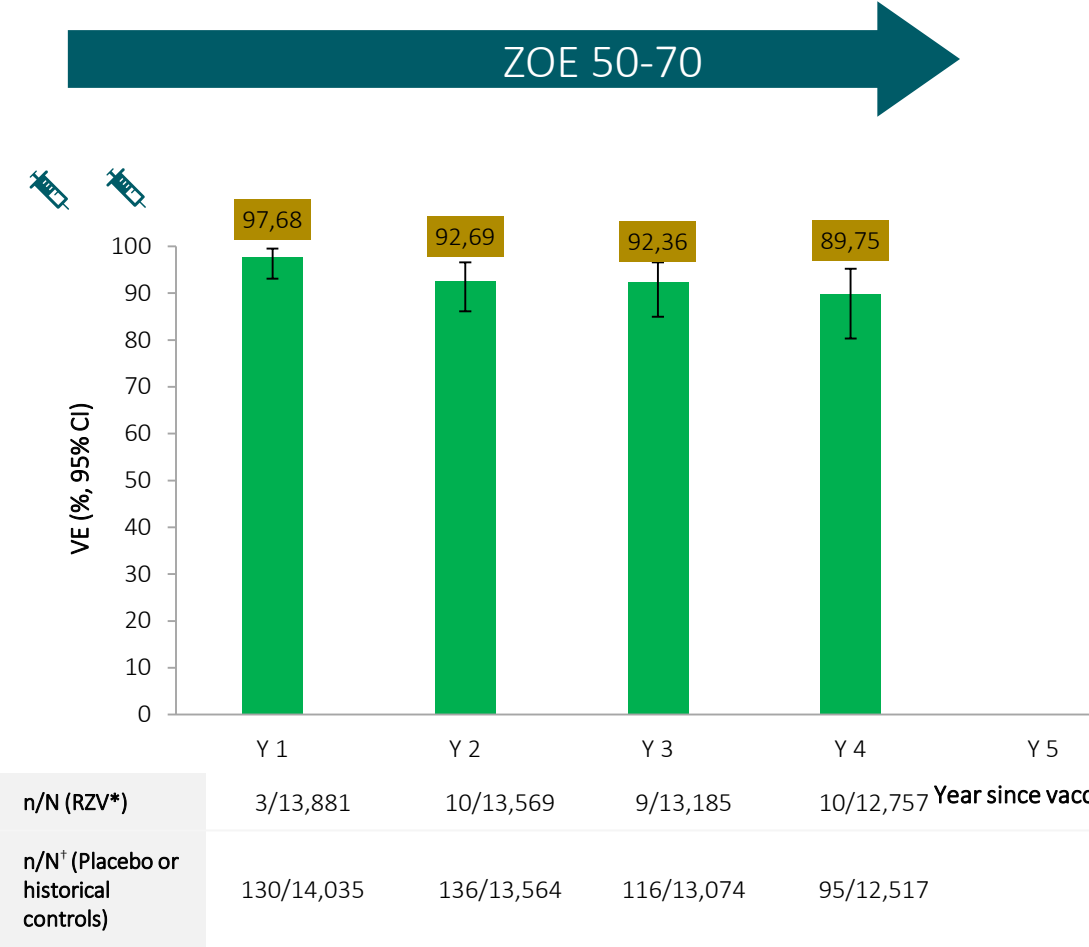


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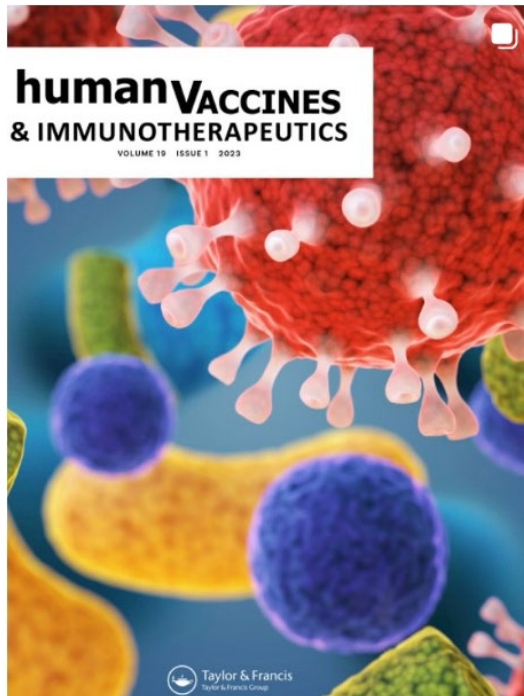
Number needed to vaccinate: 32,3



There is a long-term protection >11 years of RZV against herpes zoster: **79.7%** (95% CI 73.7–84.6)



Real-world data confirms high effectiveness of recombinant zoster vaccination against herpes zoster



Real-world Effectiveness of Recombinant Zoster Vaccine

Background A 2-dose series of recombinant zoster vaccine (RZV) was 97% effective against herpes zoster (HZ) in a pivotal clinical trial

Objective To evaluate real-world effectiveness of RZV against HZ.

Design Prospective cohort study

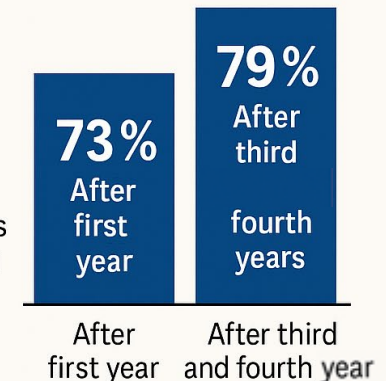
Setting Four health care systems in Vaccine Safety Datalink

Participants Persons aged 50 years or older

Measurements Outcome: incident HZ defined by a diagnosis with an antiviral prescription.

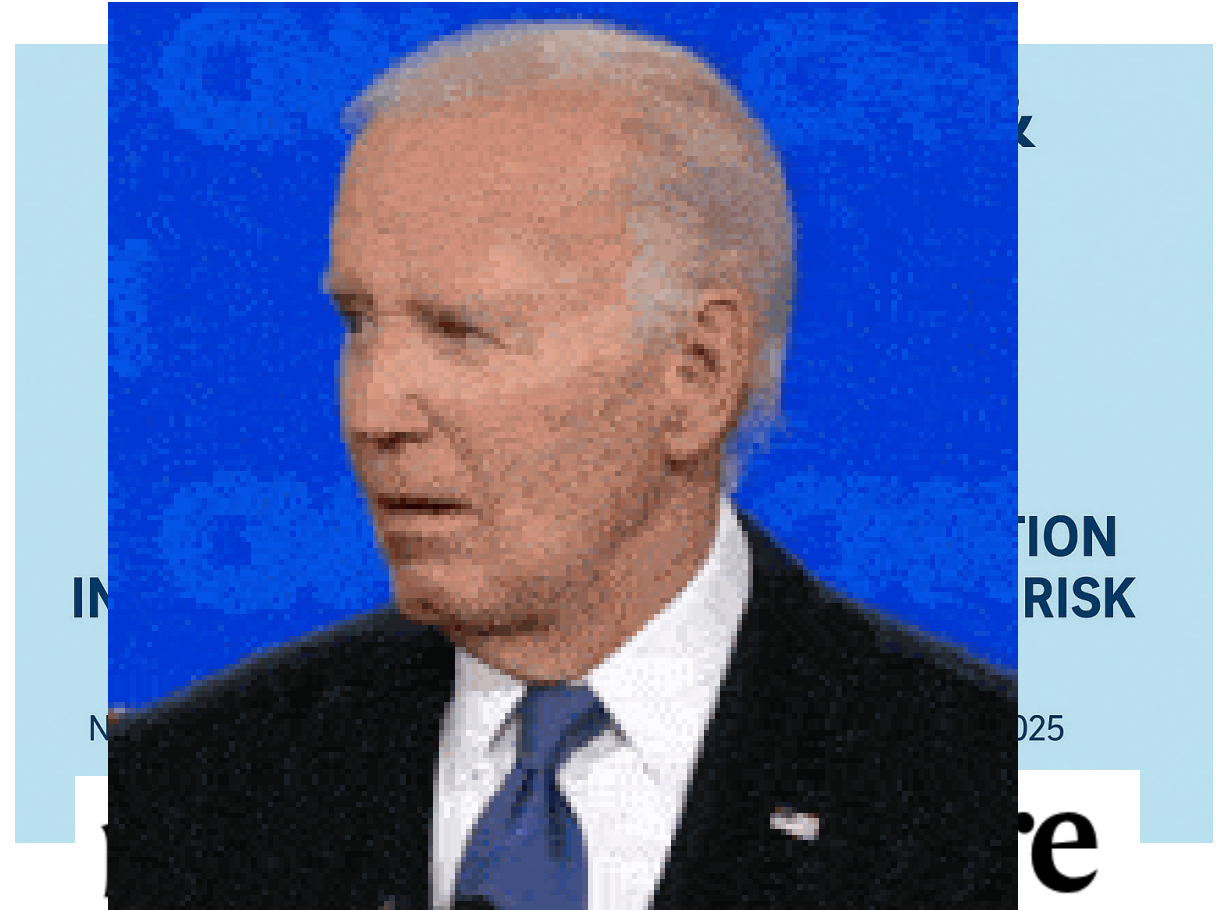
Cox regression was used to estimate the hazard of HZ in vaccinated persons compared to unvaccinated persons.

Results Study included **2.0 million persons** with **7,6 million person-years** of follow-up



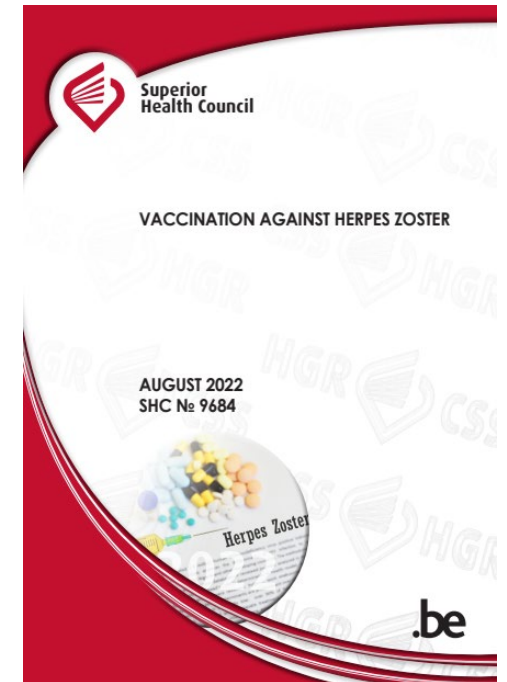
Shingles vaccination can lower the risk of dementia

- Prevents varicella-zoster virus (VZV) **reactivation**, which is linked to neuroinflammation and neuronal damage.
- **Reduces systemic inflammation**, a known contributor to neurodegenerative diseases.
- **May enhance immune resilience** against latent infections that contribute to cognitive decline.



Recommendation: herpes zoster vaccination

- Administration of recombinant zoster vaccine (Shingrix) to **people living with HIV ≥ 18 years** is recommended [IM dose month 0, month 2]
- Timing: irrespective of CD4 count
- Practical:
BE: reimbursement (chapter IV)



Dosing schedule



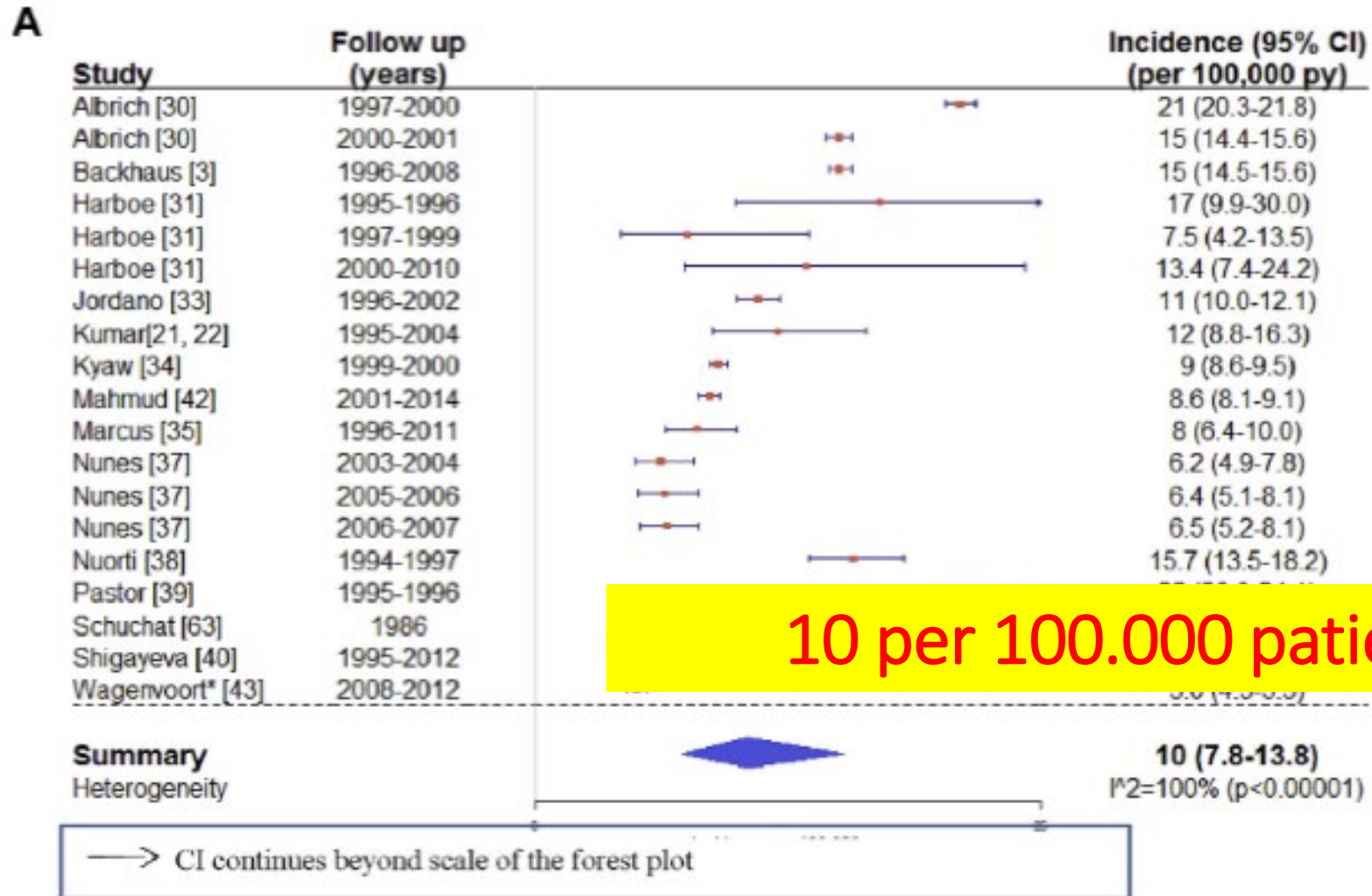
Immunisation schedule for people living with HIV* (Last update: 15 May 2025)



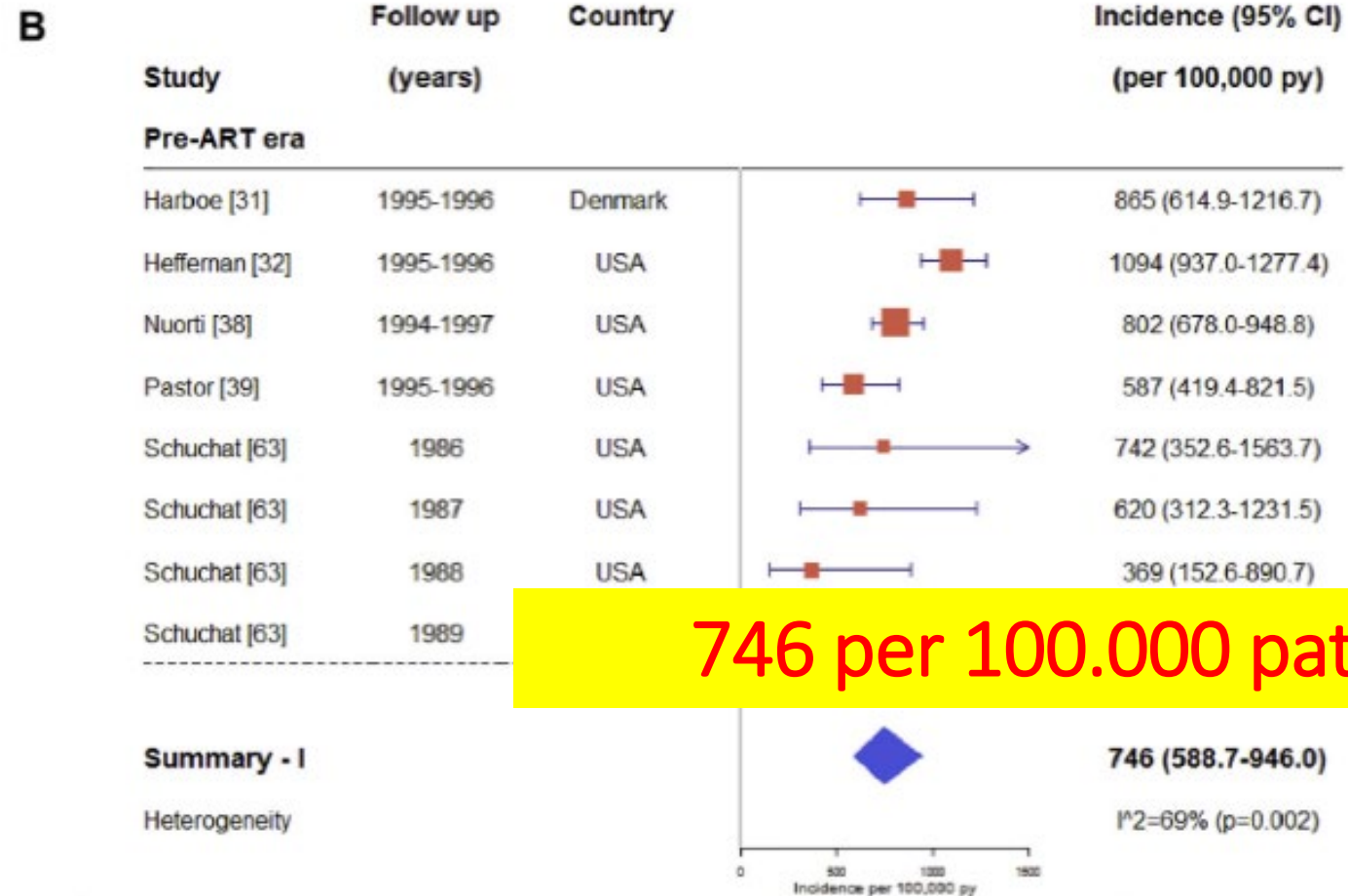
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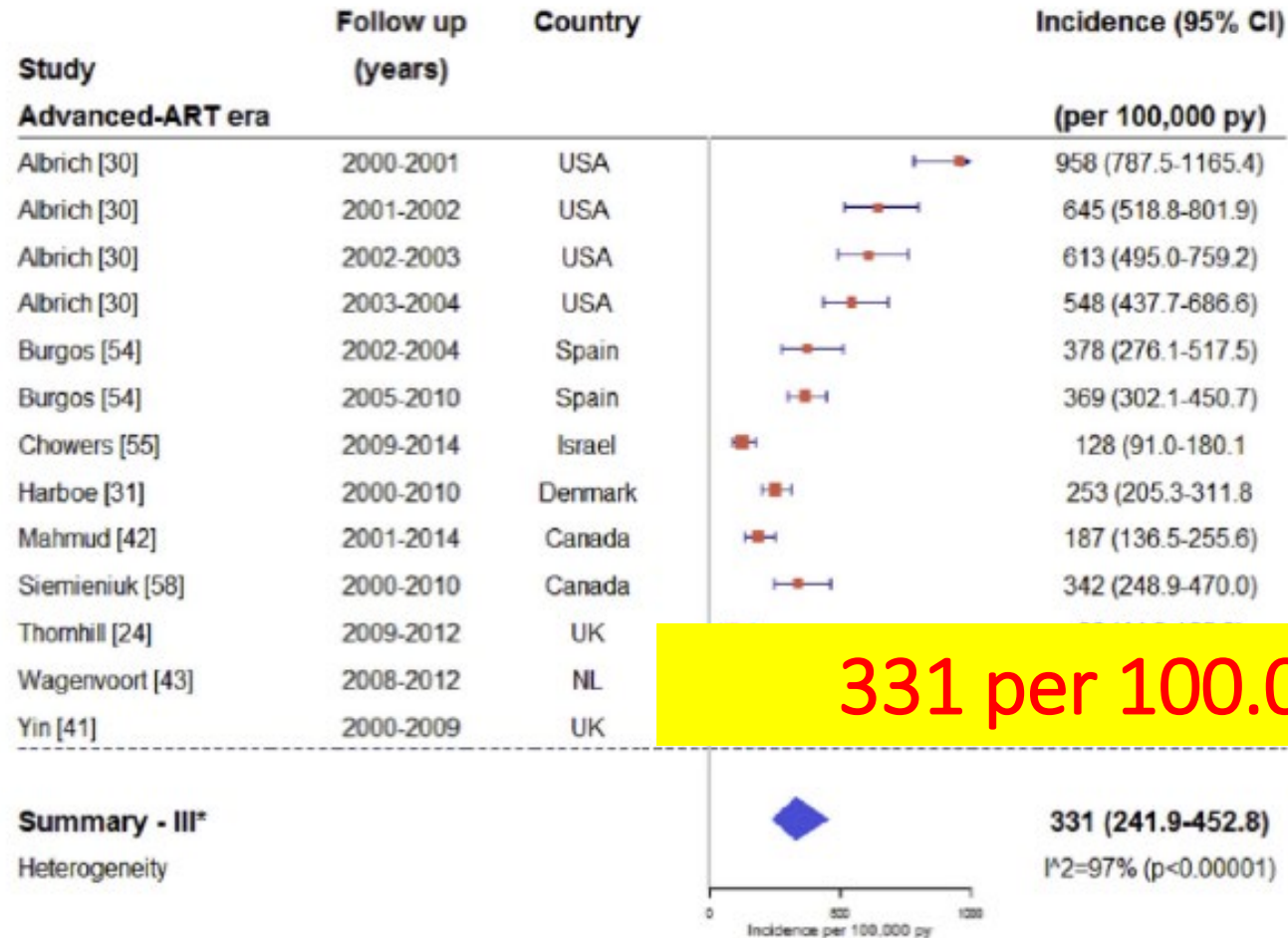
Incidence IPD healthy population



Incidence IPD in PLWHIV: pre-ART



Incidence IPD in PLWHIV: advanced-ART



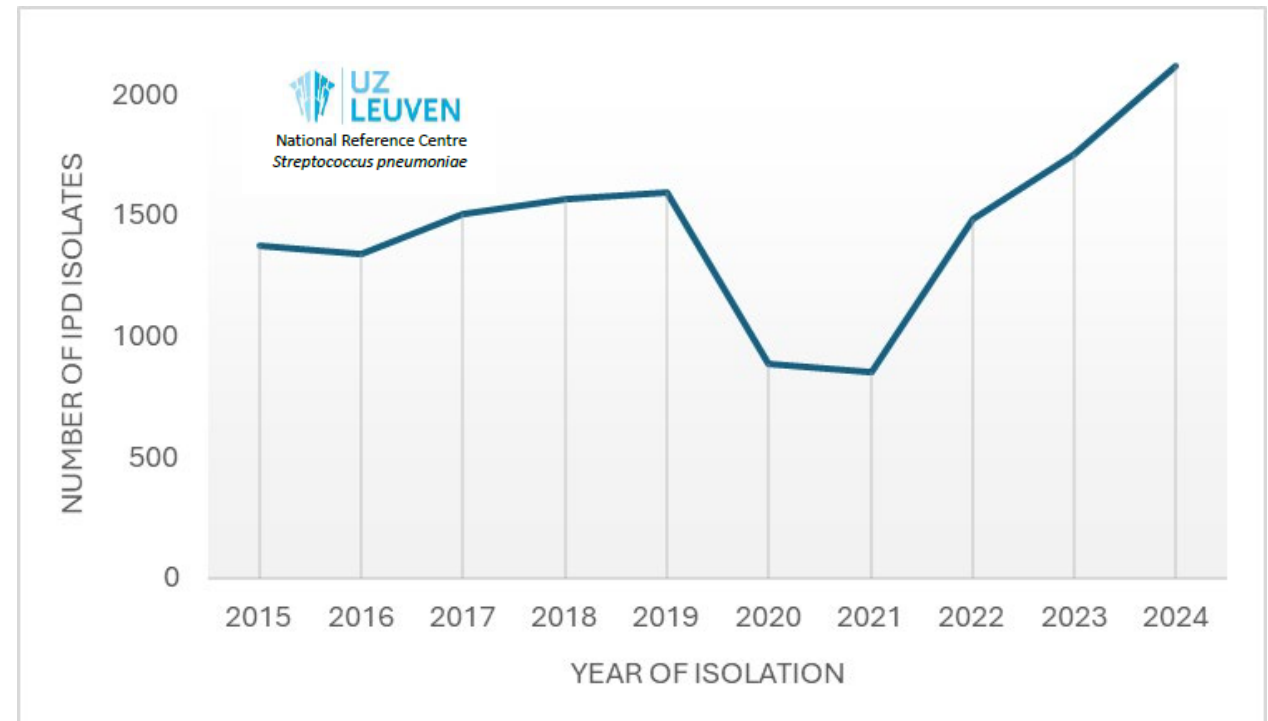
331 per 100.000 patient years



Exceptional high number of invasive pneumococcal isolates for 2024 (Belgium)

- Record year: 2,120 IPD cases
- Biggest increases: Ages 2–4 (+37%) and 65–84 (+34%)
- Serotype 12F dominant: 15% of all cases
- >70% vaccine-preventable: Covered by PCV-20 (Prevenar-20®)*

*Additional +-5-7% of IPD cases included in PCV-21 (Capvaxive®)



Distribution of serotypes of IPD isolates from 2024 (n=2120) per age group

PCV-20 includes the 13 from PCV13:
 •1, 3, 4, 5, 6A, 6B, 7F, 9V, 14, 18C, 19A, 19F, 23F
 Plus 7 additional serotypes:
 •8, 10A, 11A, 12F, 15B, 22F, 33F

PCV-21 contains:
 3, 6A, 7F, 8, 9N, 10A, 11A, 12F, 15A, deOAc15B,
 16F, 17F, 19A, 20A, 22F, 23A, 23B, 24F, 31, 33F,
 35B

The 10 serotypes that are included in both PCV-20 and PCV-21 are:
 3, 6A, 7F, 8, 10A, 11A, 12F, 19A, 22F, and 33F.

Total coverage:
 PCV-20: 70-72%
 PCV-21: 75-78% (mainly 24F (children))



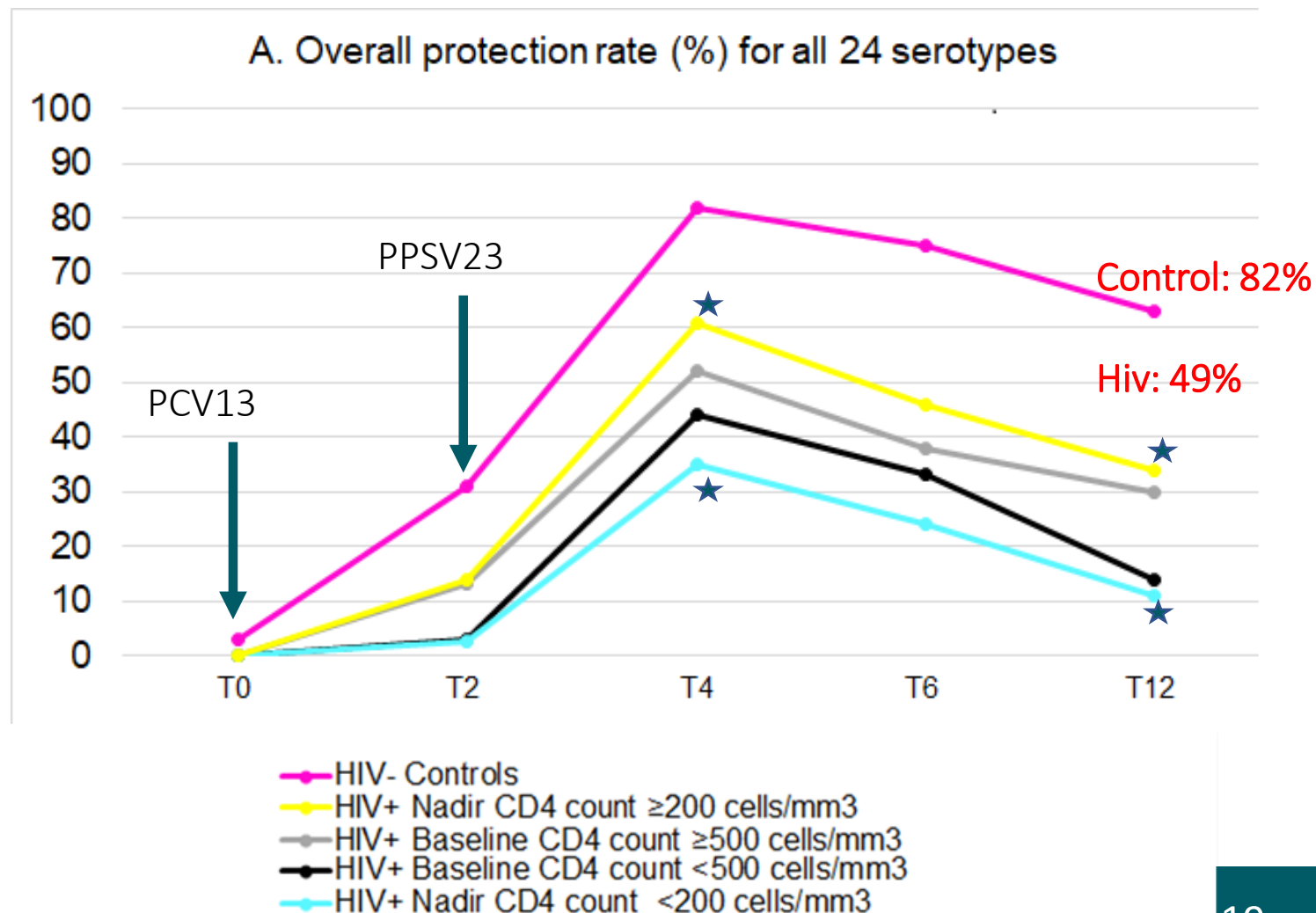
serotype		<18 years (n=278)	18-49 years (n=335)	50-64 years (n=426)	65-84 years (n=805)	>85 years (n=273)	all ages (n=2120)
12F	PCV20	19,8%	16,1%	16,4%	12,8%	10,3%	14,6%
8	PCV20	6,1%	13,4%	14,3%	12,5%	7,3%	11,5%
3	PCV13	5,4%	9,9%	8,0%	11,1%	9,9%	9,4%
4	PCV7	0,4%	21,2%	11,0%	4,7%	1,8%	7,7%
19A	PCV13	7,6%	6,3%	6,6%	6,3%	8,8%	6,8%
14	PCV7	6,8%	6,3%	3,8%	6,1%	7,3%	5,9%
9N	PPV23	2,5%	3,0%	6,8%	5,2%	6,2%	5,0%
22F	PCV15	2,9%	2,7%	3,5%	5,2%	4,4%	4,1%
24F	NVT	10,8%	1,8%	2,1%	3,2%	4,8%	4,0%
33F	PCV15	7,2%	0,6%	3,1%	3,1%	4,4%	3,3%
15A	NVT	2,2%	1,5%	1,6%	3,7%	2,2%	2,5%
6C	NVT	0,4%	2,7%	1,9%	2,5%	5,9%	2,5%
23B	NVT	3,2%	1,2%	2,1%	3,0%	2,6%	2,5%
11A	PCV20	4,0%	0,6%	1,9%	2,5%	2,6%	2,3%
16F	NVT	1,1%	1,5%	1,6%	3,0%	2,2%	2,1%
10A	PCV20	2,9%	1,8%	1,9%	2,0%	2,2%	2,1%
23A	NVT	1,8%	0,6%	1,2%	1,9%	3,3%	1,7%
31	NVT	0,4%	0,9%	1,2%	1,4%	1,8%	1,2%
7B	NVT	2,5%	0,3%	0,9%	1,1%	1,1%	1,1%
15B	PCV20	0,4%	0,6%	1,4%	1,4%	1,5%	1,1%
streptococcus pneumoniae							
7C	NVT	2,5%	0,3%	0,9%	1,1%	0,7%	1,1%
19F	PCV7	1,4%	0,6%	1,2%	1,2%	0,7%	1,1%
35B	NVT	0,7%	0,3%	0,7%	1,1%	1,5%	0,9%
35F	NVT	0,4%	1,5%	0,0%	0,9%	1,8%	0,8%
20	PPV23	0,4%	0,3%	1,2%	0,4%	0,7%	0,6%
other serotypes (< 0.5% all ages)		6,5%	4,2%	4,7%	2,6%	4,0%	4,1%



Post IgG-vaccination titres increase in hiv patients

- Peak IgG in controls 82%, hiv patients 35-61%
- Low nadir CD4 associated with poor response

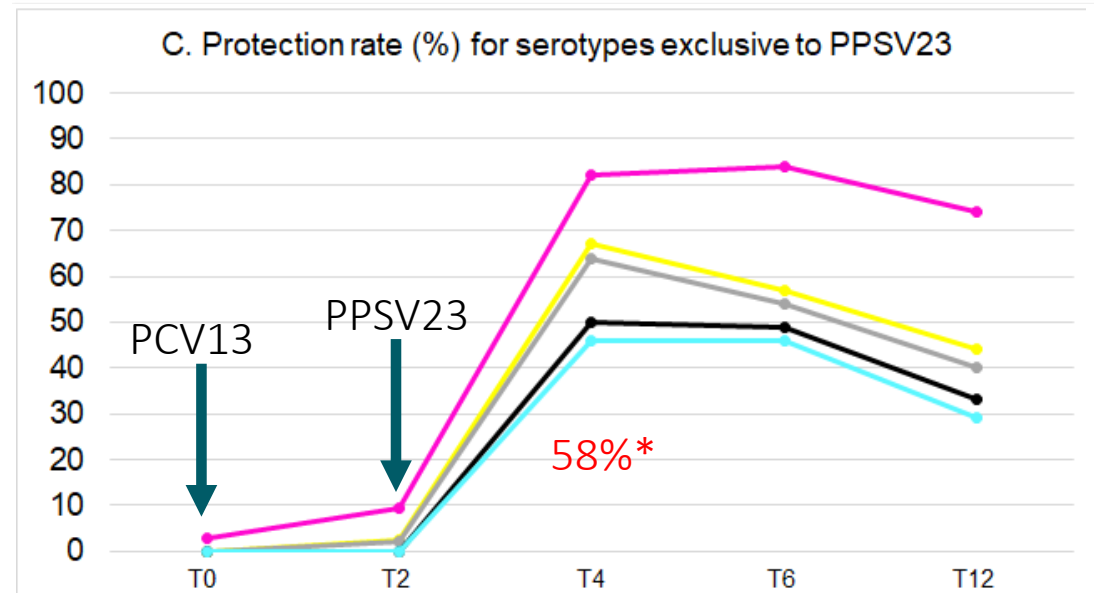
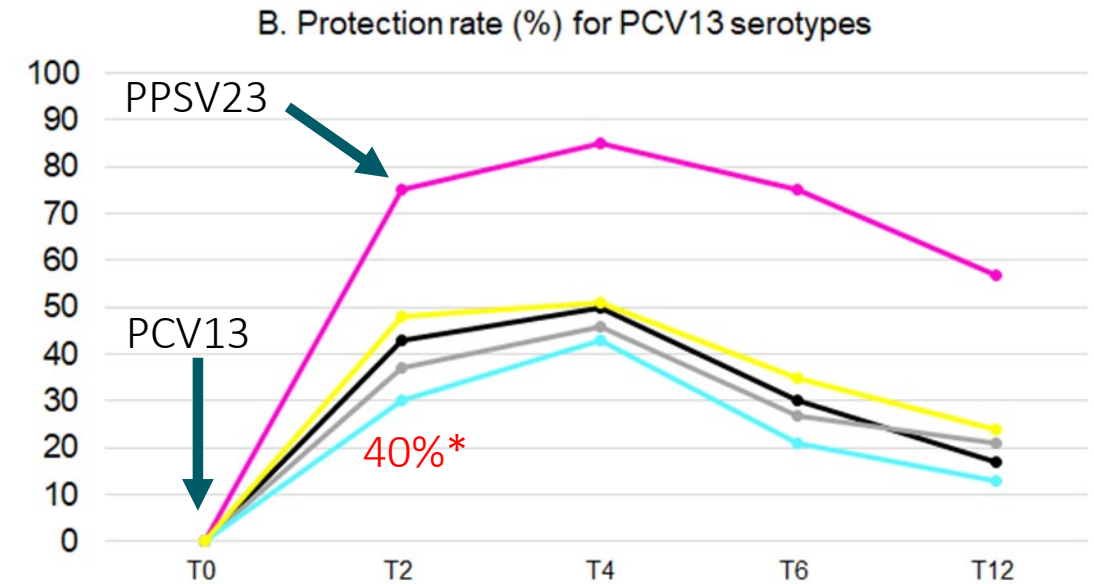
Overall protection: proportion of patients with a post-immunisation IgG concentration of $\geq 1.3 \mu\text{g/mL}$ * for $\geq 70\%$ (17/24) of the serotypes of PCV13/PPSV23.



- Quick decay in protection in 12 months (49 > 23%)
- 5 years interval probably too optimistic
- Alternative regimens (higher valent PCV vaccines, with booster?)

**Observed in ICP, but not in healthy controls: dysfunctional CD4 cells or higher antigenic dose in PPV23?*

● HIV- Controls
 ● HIV+ Nadir CD4 count ≥200 cells/mm³
 ● HIV+ Baseline CD4 count ≥500 cells/mm³
 ● HIV+ Baseline CD4 count <500 cells/mm³
 ● HIV+ Nadir CD4 count <200 cells/mm³



Recommendation pneumococcal diseases vaccination PLWHIV

- **PCV-20** (or higher valent in the future) is recommended for people with HIV >18 years old, or alternative recommended scheme: PCV-15 followed by PPSV-23.
- PCV induces immunological memory, contrary to PPSV23 that only elicits a (T-cell-independent) plasma cell response.
- Booster every 5 years (PCV-20 or higher valent)
- Timing vaccine: PCV irrespective of CD4 count, PPSV-23 preferably if CD4 is higher (for better response)



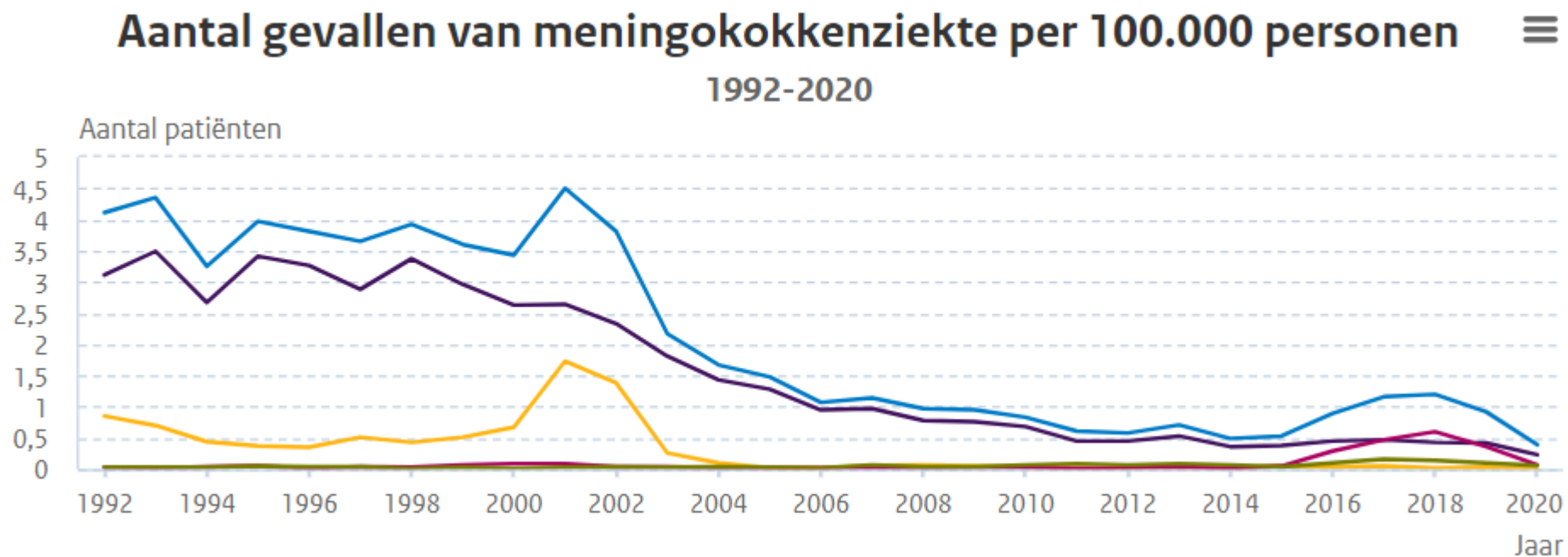
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The absolute risk on invasive meningococcal disease is very low, number needed to vaccinate?



Invasive meningococcal disease (IMD) in PLWHIV

- Risk factors IMD: hiv +, passive home smoke exposure, crowded living space, age group 25-44 years old
- HIV: Low CD4 count, high viral load
- HIV; 6-fold (5-13) more risk IMD

Open Forum Infectious Diseases

BRIEF REPORT

Meningococcal Disease in Persons With HIV Reported Through Active Surveillance in the United States, 2009–2019



H. Dubey, P. Oster, M.S. Fazeli et al.

A: HIV-positive vs. HIV-negative.

Author (Year)

Meiring et al (2019)

Miller et al (2014)

Simmons et al (2015)

RE Pooled Estimate

OR 4.77

Weight RR (95% CI)

38.40 2.50 (2.20, 2.80)

29.14 10.00 (7.20, 14.10)

100.00 4.77 (2.16, 10.51)

Less risk of IMD More risk of IMD

B: HIV-positive vs. HIV-negative (ages 25 to 44 years old).

Author (Year)

Miller et al (2014)

Simmons et al (2015)

RE Pooled Estimate

OR 11.88

Weight OR (95% CI)

75.96 11.90 (7.30, 19.20)

24.04 11.80 (5.00, 27.90)

100.00 11.88 (7.79, 18.10)

Less risk of IMD More risk of IMD

Review

Risk Factors for Contracting Invasive Meningococcal Disease and Related Mortality: A Systematic Literature Review and Meta-analysis

Himanshu Dubey^{a,*}, Philipp Oster^a, Mir Sohail Fazeli^b, Sandra Guedes^a, Paul Serafini^b, Lisa Leung^b, Amine Amiche^c

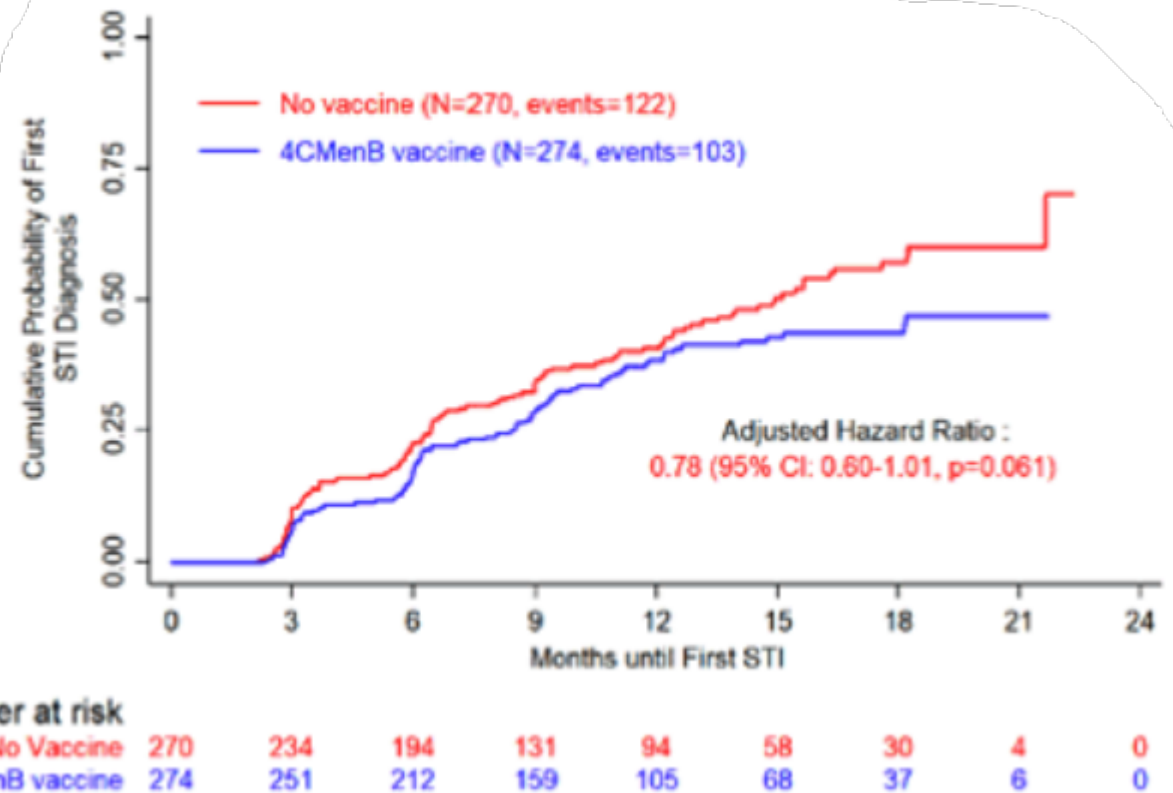
Meningococcal B vaccines do not protect against gonorrhoea

- Meningococcal B vaccines have been associated with 24-46% reduction in gonorrhea infections

ANRS DOXYVAC trial :

- No significant difference first episode or cumulative incidence

aHR: 0.78 (95% CI 0.60-1.01 p=0.061)



Recommendation for meningococcal vaccination ACWY in PLWHIV: specific situations

- Consider vaccination (shared-decision making)
- Consider vaccination if specific situations (e.g. crowding, not previously vaccinated, young age, smoking, MSM travelling to meningitis-belt (Africa), epidemics)

Meningococcal B vaccination in PLWHIV:

- Men B vaccines: if additional risk factors (e.g. asplenia)
 - Do not use meningococcal B vaccine for prevention of gonorrhoea (very limited, and temporary benefit)
-
- *If reimbursement:* recommended for everyone living with hiv



Immunisation schedule for people living with HIV* (Last update: 15 May 2025)



Vaccine	16-26 years	27-59 years	60-64 years	≥65 years
HPV	2 or 3 doses (0 and 6 or 0, 2, and 6 months)	27-45 years: shared decision making		
Influenza	1 dose annually			Consider high dose
COVID-19 ¹	1 dose annually			
Pneumococcal disease ²	1 dose of PCV-20. Revaccination: every 5 years with PCV-20 (or higher valent)			
RSV	Considering during pregnancy ²		1 dose (patients with co-morbidities)	
Zoster recombinant	RZV: 2 doses at month 0 and month 2-6 if ≥18 years old			
Tetanus, Diphtheria, and Pertussis (Tdap)	1 dose of Tdap. Booster: every 10 years, (women: every pregnancy in week 22).			
Measles, Mumps, Rubella (MMR)	1 or 2 doses (if no immunity and CD4 ≥ 200 mm ³).			
Hepatitis A ³	2 doses, Month 0 and Month 6-12. Hep A IgG 1 month later if no immunity			
Hepatitis B	If no prior vaccination and no immunity, 3 doses (month 0, 2 and 6), Hep B anti-HbS 1 month later (or during next consultation) (immunity if >10 IE/l)			
Meningococcal ⁴	If no prior vaccine, 2 doses of Men ACWY 8-12 weeks apart. Booster: every 5 years. Meningococcal B vaccine: if specific risk factors			
Mpox	2 doses; day 0, day 28 (if risk factors)			
Dengue (travel)	If previous infection: 2 doses, month 0 and 3 (if CD4 ≥ 200 mm ³)			
Yellow fever (travel) ⁵	1 dose, a single yellow fever revaccination is recommended for all PLWHIV and should preferably be administered before the next travel to a yellow fever endemic area with a minimal interval of 28 days. (if CD4 ≥200 mm ³).		Relative contra-indication ≥70 years for primo vaccination (shared decision making)	



High dose influenza vaccine: should we use it?

- Commonly used in BE/NL: 'standard dose vaccines' 15 µg (e.g. Alpharix-Tetra[®], Influvac Tetra[®], Vaxigrip Tetra[®])
- Belgium: high-dose vaccine available : Efluelda[®] 60 µg (BE reimbursement BE >65 year old in specific settings) € 40,87 
- High dose influenza vaccine is more immunogenic in older adults (65 year and older)¹
- More immunogenic in people living with hiv²
- Protection against laboratory confirmed influenza, but data on mortality benefits different per season^{3,4}



Immunisation schedule for people living with HIV* (Last update: 15 May 2025)



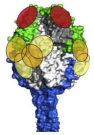
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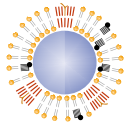
Overview of EMA-approved RSV vaccines for adults

RSVPreF3 OA (Arexvy) of GSK¹

Recombinant RSV pre-fusion F protein vaccine, adjuvanted with AS01_E



RSVPreF3 (RSV-A) antigen
(120 µg)



AS01E adjuvant system

Indication

Active immunisation for the prevention of lower respiratory tract disease (LRTD) caused by respiratory syncytial virus in:

- adults 60 years of age and older;
- adults 50 through 59 years of age who are at increased risk for RSV disease.

RSVPreF3 (Abrysvo) of Pfizer²

Recombinant RSV pre-fusion F protein vaccine, bivalent



RSVPreF (RSV-A) antigen
(60 µg)



RSVPreF (RSV-B) antigen
(60 µg)

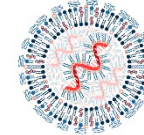
Indication

Passive protection against lower respiratory tract disease caused by respiratory syncytial virus (RSV) in **infants from birth through 6 months of age following maternal immunisation during pregnancy.**

Active immunisation of **individuals 60 years of age and older** for the prevention of lower respiratory tract disease caused by RSV.

RSV mRNA-1345 (mResvia) of Moderna³

Single-stranded 5' capped mRNA vaccine encoding the RSV pre-fusion F protein



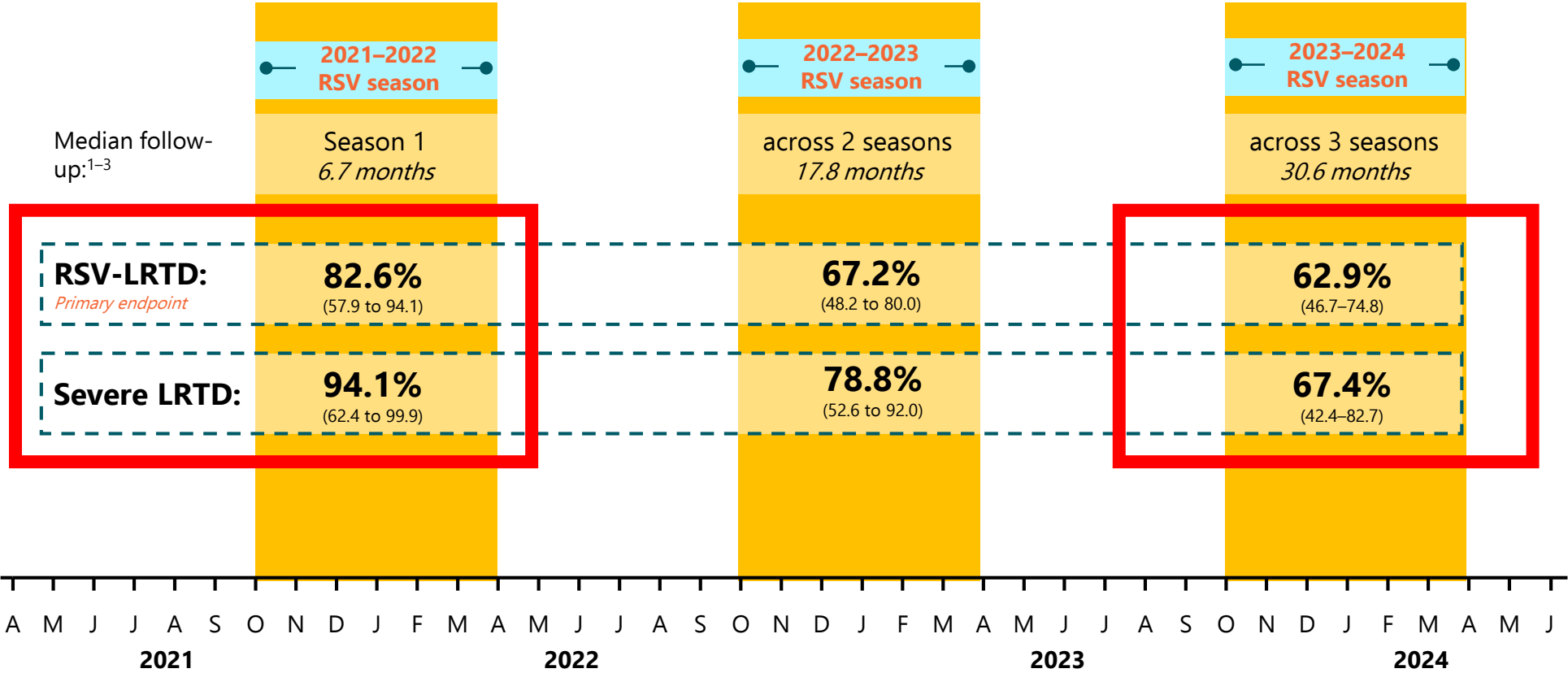
RSVPreF (RSV-A) mRNA (50 µg)
Moderna lipid nanoparticle capsule

Indication

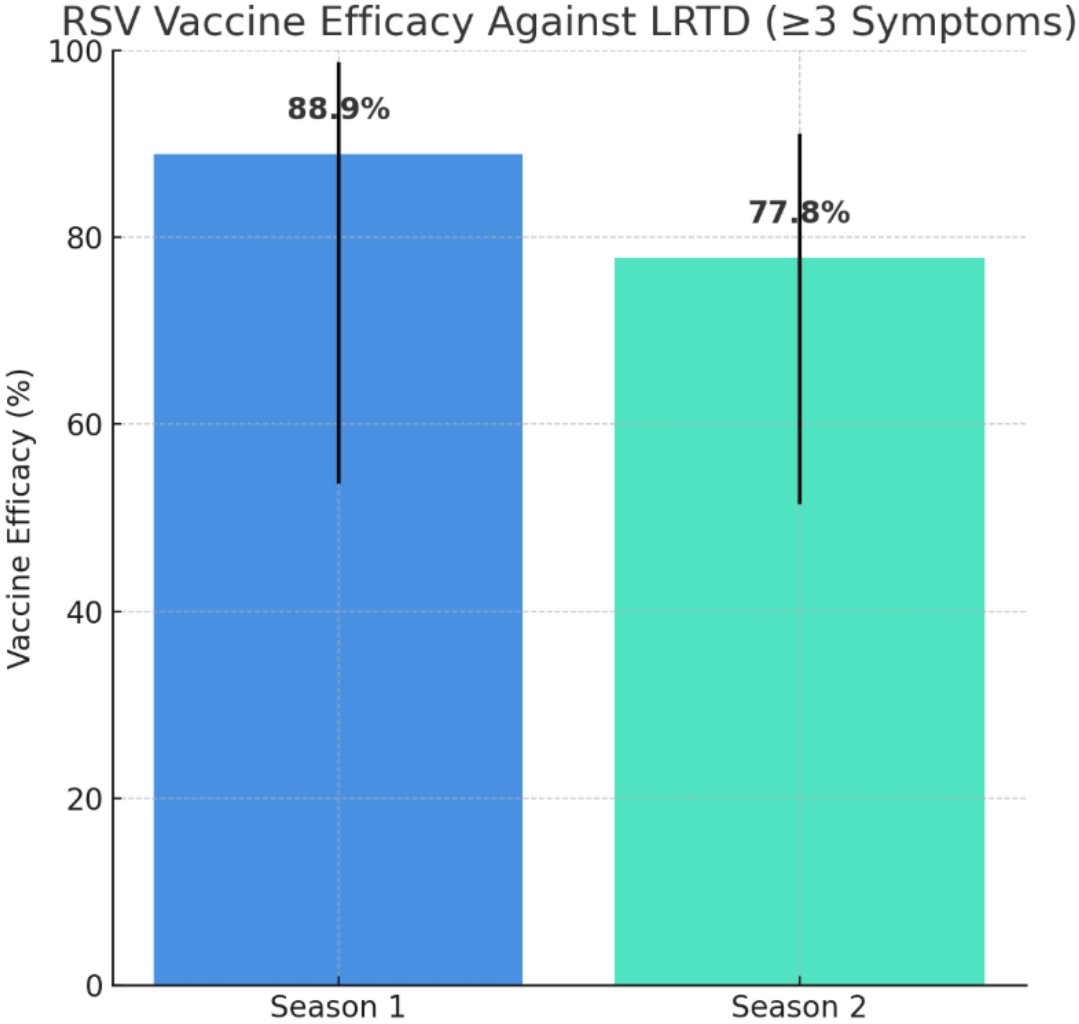
Active immunisation for the prevention of lower respiratory tract disease (LRTD) caused by Respiratory Syncytial Virus in **adults 60 years of age and older.**



Vaccine efficacy of a single dose of RSVPreF3 (Arexvy) against RSV-disease in adults aged ≥60 years over 3 full RSV seasons1-3



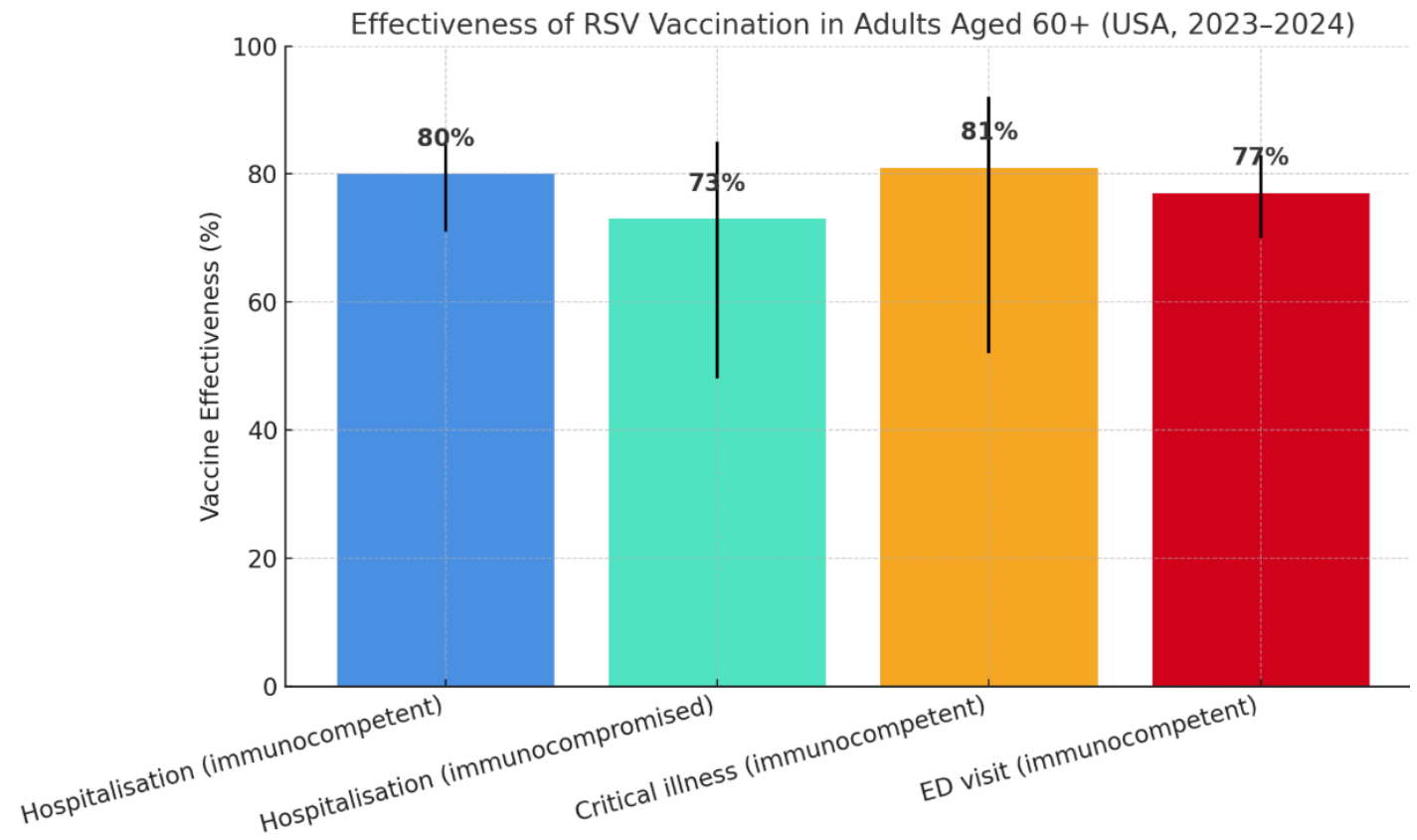
Vaccine efficacy of a single dose of RSVpreF (Abrysvo) against RSV-disease in adults aged ≥60 years over 2 full RSV seasons



Real-world data shows effectiveness of RSV vaccine on hospitalisation (vaccine: Abrysvo[®] or Arexvy[®])

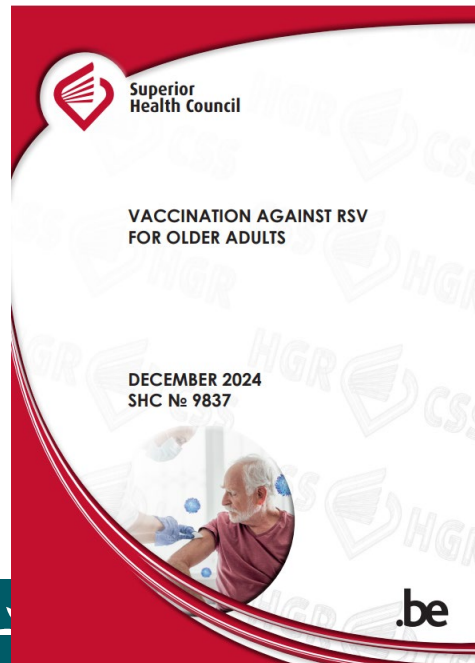
- Protection did not differ per age group (60–74 vs ≥75 years nor vaccine given)
- Effectiveness appeared to decline over time

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Recommendation for RSV vaccination

- 1 dose IM (September/October) of Arexvy[®] (GSK) / Abrysvo[®] (Pfizer) RSV vaccine, *mResvia* (Moderna, not yet available)
- >60 years old PLWHIV
- >75 years old: everyone



Risk factors for severe RSV disease include:

- Immunodeficient patients
- Chronic Kidney Disease
- Severe obesity (BMI ≥ 40)
- Chronic Respiratory Diseases (COPD, asthma, bronchiectasis, interstitial lung diseases, chronic respiratory failure)
- Current smoker
- Chronic Heart Failure – Coronary Artery Disease
- Diabetes
- Stroke

Immunisation schedule for people living with HIV* (Last update: 15 May 2025)



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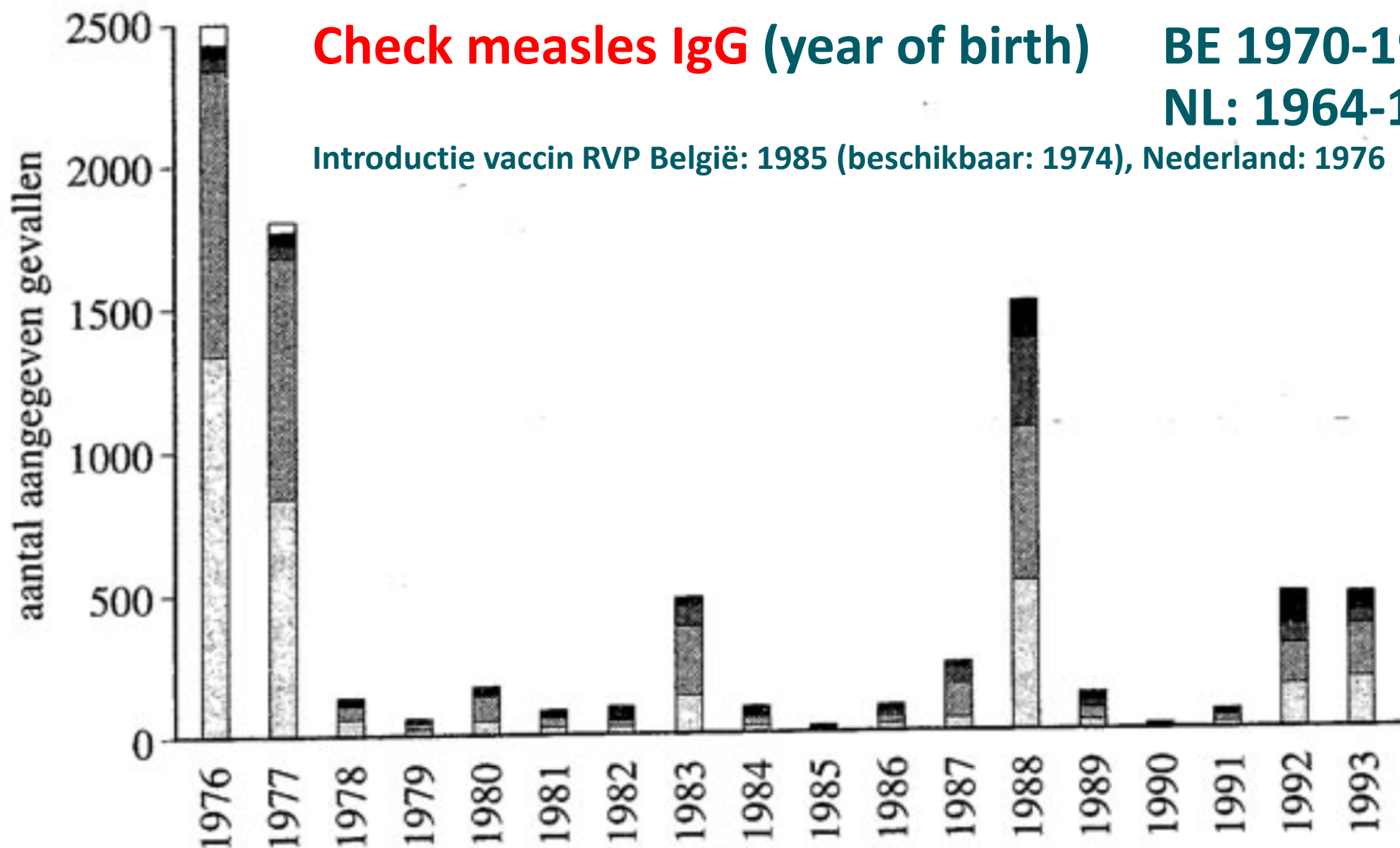


Check measles IgG (year of birth)

BE 1970-1985

NL: 1964-1976

Introductie vaccin RVP België: 1985 (beschikbaar: 1974), Nederland: 1976



Measles vaccination= MMR (Mumps-Measles-Rubella) is a **live-attenuated vaccine**

Contra-indication if CD4-count <200 cells/mm³

Belgium (not applicable to immigrants)



- Born before 1970: experienced as a child
- Born after 1970, vaccinated once: a second dose is recommended
- Born after 1970, never vaccinated, never had measles: 2 doses with 4 weeks in between

Mortality measles in immunocompromised 40-70%¹



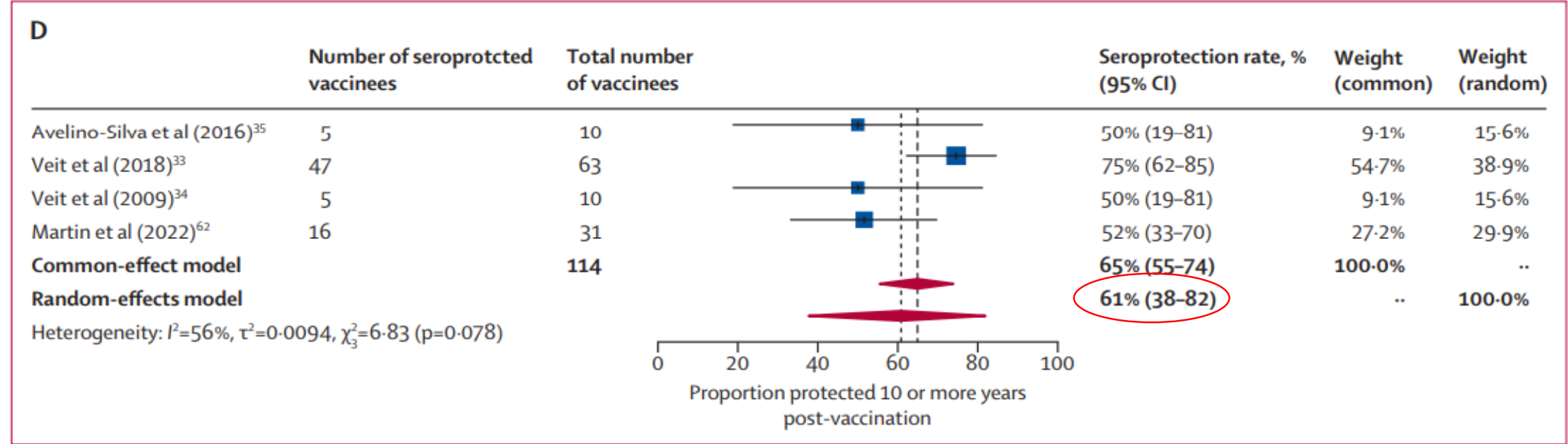
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Single yellow fever vaccination provides good lifelong (>10 years) protection in healthy adults (non-endemic regions) but in PLWHIV the seroprotection rate is lower.



Seroprotection: 61%
(95% CI 38-82%)

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Global Health

Articles

Long-term immunity following yellow fever vaccination:
a systematic review and meta-analysis

Jenny L Schnyder, Hanna K de Jong, Bache E Bache, Frieder Schaumburg, Martin P Grobusch



Yellow fever breakthrough infections after yellow fever vaccination: a systematic review and meta-analysis

Jenny L Schryder, Bache E Bache, Matthijs R A Welkers, René Spijker, Frieder Schaumburg, Abraham Goothuis, Martin P Grobusch, Hanna K de Jong



Summary

Background Yellow fever vaccination is considered to provide effective long-term immunity. However, yellow fever breakthrough infections in vaccinated patients have been reported. In this systematic review and meta-analysis we aimed to identify and summarise all documented symptomatic yellow fever breakthrough infections in the literature occurring less than 10 years and 10 years or more after primary yellow fever vaccination.

Methods We searched MEDLINE (Ovid), Embase (Ovid), and Global Index Medicus for records published between Jan 1, 1936 (introduction of yellow fever vaccination) and June 16, 2023. We included prospective and retrospective cohort studies, case series and reports, and epidemiological reports from national and international health organisations reporting symptomatic yellow fever among individuals vaccinated 30 days or more before symptom onset. We excluded cases vaccinated less than 30 days before symptom onset. The primary outcome for the meta-analysis was the proportions of vaccinees among virologically confirmed and probable cases of yellow fever (IgM seroconversion without seroconversion to other flaviviruses). Risk of bias was assessed with an adapted version of the Newcastle-Ottawa Scale. Records of moderate or good quality (probable or confirmed yellow fever diagnosis with documented proof of previous vaccination) were included for random-effects meta-analysis. This systematic review and meta-analysis is registered with PROSPERO, number CRD42023450205.

Findings After reviewing 1975 records, 37 records reported a total of 6951 yellow fever cases, of which 537 were vaccinated. 31 records were of low quality. Nine confirmed and 24 probable cases with proof of previous yellow fever vaccination were identified, all from Brazil. Confirmed cases were vaccinated 3 months to 3 years before symptom onset; of these patients two fell severely ill and died. The pooled proportion of verified yellow fever breakthrough infections among probable and confirmed cases was 3% (95% CI 1–19%). No confirmed yellow fever breakthrough infections were identified occurring 10 years or more after yellow fever vaccination.

Interpretation Yellow fever breakthrough infections documented in literature are rare, and not necessarily more common 10 years or more after primary yellow fever vaccination. This finding suggests that a single dose of yellow fever vaccination is sufficient to provide lifelong protective immunity against symptomatic yellow fever.

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1 revaccination yellow fever for all PLWHIV for next travel

The Superior Health Council (SHC) recommends vaccination against yellow fever for people aged ≥ 9 months*:

- When travelling to a **country** with risk of yellow fever**.
- If there is an administrative obligation: traveling to, transiting through, or residing in countries that require an International Certificate of Vaccination or Prophylaxis (ICVP) for entry.
- Laboratory worker or personnel involved in handling live yellow fever virus.

For most people, a single dose of yellow fever vaccine provides lifelong protection. A single revaccination is recommended for certain target groups (listed below).

Vaccination is not recommended when visiting a country with low potential of yellow fever exposure.

A map showing the regions where vaccination is recommended is published on <https://www.wanda.be/en/a-z-index/yellow-fever-world-map/>



ADVISORY REPORT OF THE SUPERIOR HEALTH COUNCIL no. 9844

Vaccination against Yellow Fever

In this scientific advisory report, which offers guidance to public health policy-makers, the Superior Health Council of Belgium provides recommendations of vaccination against yellow fever.

This version was validated by the Board on
Date of validation (Day and month in full)¹



Future perspectives;

- BREACH working group for uniform immunisation guidelines
- Future plan: specialized nurse-based vaccinations for PLWHIV?

6. Nurses staff the front lines of immunization.



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Thank you

Thank you!

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